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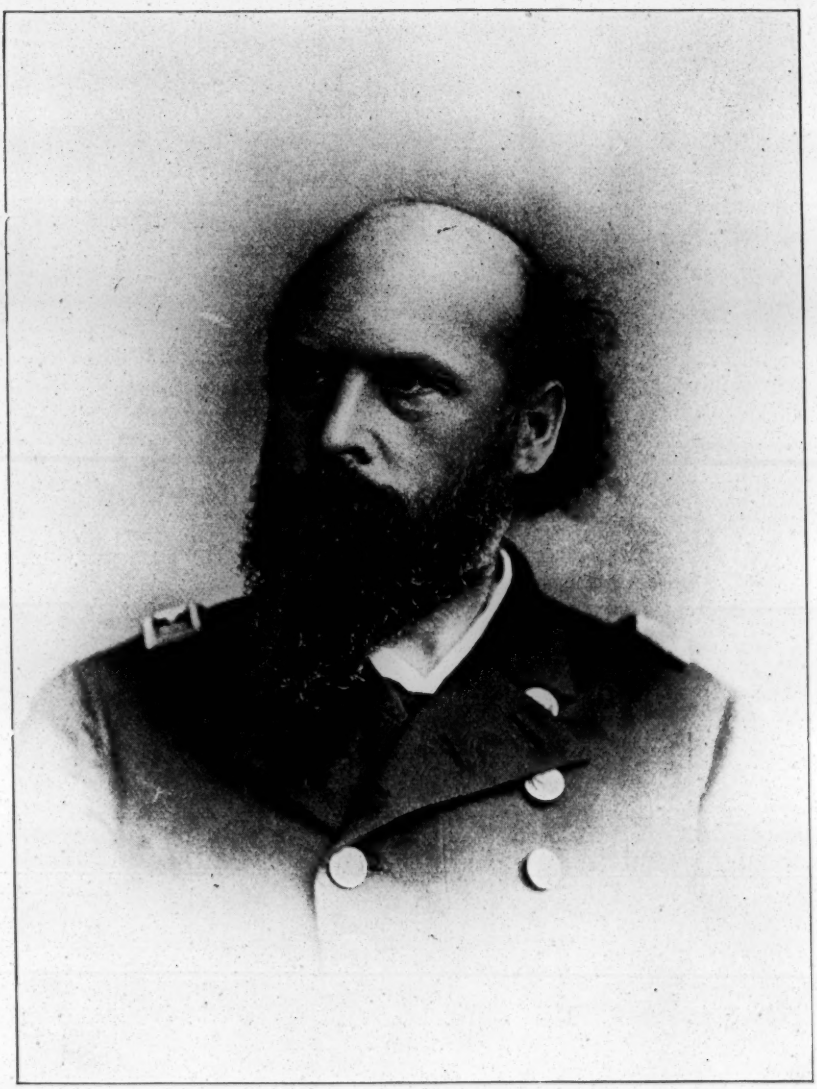

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THE
National Geographic Magazine

VOL. VIII JUNE, 1897 No. 6

THE EFFECTS OF GEOGRAPHIC ENVIRONMENT IN THE DEVELOPMENT OF CIVILIZATION IN PRIMITIVE MAN*

By HON. GARDINER G. HUBBARD, LL. D.,
President of the National Geographic Society

I have selected as the subject for my annual address "The Effect of Geographic Environment on the Development of Civilization in Primitive Man."

The interest of this subject is not confined to the history of the various stages of life through which man has passed, for his past modifies our views of the present and is a prophecy of the future.

It is my province to treat of the effects of different environments on the development of primitive man. This development, though on the whole beneficial, has ever been a mingling of good and evil. Its progress has been hitherto intermittent—originally very slow, requiring thousands of years, possibly tens of thousands, to gain slight results; advancing sometimes with quicker pace, often retrograding, sometimes apparently dying out, probably because its progress is often invisible. It has never been uniform in any race, nation, or country, though progressing more rapidly in higher stages and in modern times.

That civilization has been and must be beneficial to mankind we cannot doubt, though every upward step has been the cause of suffering, loss, and death in many ways before unknown. The discovery of America was followed by the death of tens of thousands of negroes in Africa and of Indians in America. The civ-

*Annual presidential address, delivered before the National Geographic Society, March 1, 1897.

ilization of the Hawaiian and other islands of the Pacific ocean caused a great diminution in the number of their inhabitants and the entire extinction of some tribes. No discovery or invention was ever made, whether of fire, of the bow, of gunpowder, of printing, steam, or electricity, of the telegraph, telephone, or bicycle, that did not bring with it changes in civil, social, and private life and in business transactions. The greater the value of the invention, the greater the disturbance of established habits, trade, and business. The cotton gin enriched the South, but made slavery profitable and led to our civil war. The railroad, steamship, and telegraph revolutionized the entire commerce of the world, and ruined many wealthy and long established mercantile and commercial firms. The civilization of past ages was never the enlightenment and elevation of the whole nation, it was the upbuilding of the higher classes in knowledge, culture, wealth, and power, and the oppression and debasement of the lower classes.

Comfort, happiness, and length of life are ever increasing with civilization. Individual strife is prevented by law, warfare is controlled, new and improved varieties of food, shelter, and clothing add to the sum of human happiness. Civilized man has become a highly developed and sensitive organism, with increased susceptibilities to both pain and pleasure. It is the purpose and effect of modern civilization to offer opportunities which shall raise the whole race to an elevation never yet attained.

One of the most striking features in the development of civilization, though hitherto little considered, is its relation to and dependence on geographic environment. In our earliest studies of man we find him the creature of his environment, only progressing in those directions and at that rate to which he is forced by his necessities. As we follow him through different and progressive stages of development, we find still the influence of geographic environment in directing, in stimulating, or retarding his progress. Indeed, so marked is the effect of geographic environment on any primitive people that, given the environment, the geographer can determine the character, religion, and habits of life of that people.

We were formerly taught that some four or five thousand years back in the world's history a man, perfect and complete, was created, the ancestor of the human race, to whom was given lordship over the beasts of the field and the fowls of the air and dominion over all nature. Modern research and the discovery

of the remains of ancient man have proved that no less than twenty thousand years, probably a much longer time, has passed since he first appeared upon the earth, and that he was then little superior, either in mental or moral qualities, to the animals by which he was surrounded, while greatly their inferior in strength. Whatever his origin, the causes which lifted him from this low estate proceeded from without and not from within.

The earliest traces of man are found in what is known by geologists as the Pliocene formation. They lie buried in deposits of gravel or in caves, and consist of fragments of chipped flints pointed into spear or arrow heads, and of bones (and in some cases of stones) shaped into rude fish-hooks.

With these flints are found bones of animals, with probably a few human bones. From these remains we gather that man had not only learned to defend himself from the wild animals about him, but probably to use their flesh for food and their skins for clothing. He lived in caves, in trees, or in rude huts sometimes built on piles or shell walls sufficiently separated from the land to make him secure from attack. We have no evidence that the use of fire was known to him. Gradually, step by step, we see him by slow advances become through geographic environment a hunter, a fisherman, a nomad. From a dweller in caves and trees he becomes a dweller in tents—finally gathering into families, tribes, cities, nations.

So much and so little do the gravels of river beds and rocks tell us of early man. But in existing peoples, in various parts of the earth—in the Dwarfs and Hottentots of Africa; in the Andamans of the Indian ocean; in the Papuans of the islands of the Pacific; in Tierra del Fuego; in the aborigines of Australia; in the inhabitants of the Arctic regions—we find man still in a very low stage of development, corresponding to, and little superior to, that of the drift and cave men. That these races have continued through so many ages in the same condition, and that others have risen through successive stages to the highest civilization, we believe to be the result of geographic environment. Had the environment been everywhere the same, progress must have been the same over the whole earth. But with every degree of latitude, every change of altitude, every variation of climate, every variation of rainfall, conditions are changed and progress is hastened or retarded.

Let us go back to primitive man as we still find him in Equatorial Africa, in the Arctic regions, in Central Asia, as he was in

Europe for countless ages, and trace the effect of geographic environment on his condition in each of these countries.

The whole of Africa was at one time probably occupied by the Dwarfs or Hottentots. The climate is warm, clothing is unnecessary; they require but slight shelter for protection against sun and rain. Their dwellings are either in trees or rude huts, with thatched roofs, sometimes open on every side. The streams and jungles furnish fish, birds, and animals for food and also roots and fruits. They become expert in laying snares and traps, in catching fish, and in hunting. Further needs they have none. There is neither necessity nor inducement for other exertion or for further development. Their environment has made them and keeps them what they are. A stronger race of negroes from the north, with better weapons, drove them into the hottest jungles of Central and South Africa; there they remain. Again, other races appeared, and to maintain their position the negroes must improve their weapons, must learn to make bows and poisoned arrows, spears and javelins, must clear spaces in the forest, erect palings around them, gather within these enclosures, and invent a system of alarms. To protect themselves from wild beasts they learned the use of fire and invented means of lighting a fire by friction. Gradually they gathered into families, and fire was used for cooking animal food. Sometimes the meat was hung over the fire on a spit; sometimes cooked in ant-holes with hot stones. The date and cocoanut palm supplied them with food, shelter, and light. They had advanced a stage beyond the Dwarfs and Hottentots, but as their environment encouraged no further progress they remained stationary.

In the Arctic regions the environment and therefore the conditions of life are different, but equally unfavorable to progress. In these regions clothing is a necessity, and to obtain the skins of sea and land animals the Arctic man was driven to invent snares and weapons and to make rude boats. In a land of snow and ice he must have a warm, tight shelter as well as clothing; so he builds huts of blocks of stone or ice covered with snow. He makes a fire and gathers moss for fuel. As his surroundings afford him scanty vegetable food, and that only in the short summer, he dries berries and mosses; he smokes and freezes the flesh of bear, seal, and walrus, and lays in a supply for winter use. The animals which surround him are generally not the ferocious beasts of warmer climates; the dog and reindeer become his companions and friends. Gradually he learns to use them

in his service, and thus from the environment came the domestication of animals in the Arctic regions. The denizen of the far north cannot cultivate the ground, for the frozen earth refuses to yield any return for his labor. All the energies of the Arctic man are expended in contending with the elements and striving to secure from sea, snow, and ice the oil, skins, food, and habitation necessary for the support of life. His body is enervated by the intense cold, and his mental, physical, and moral growth is dwarfed and stunted.

Thus we see that the geographical environments of intense heat and intense cold develop different faculties, but in neither does man progress toward civilization.

Let us turn to a temperate climate, to the vast steppes and plateaus of Asia, which extend from southeastern Russia, past the Caspian and Ural seas, northeastward and eastward through upper Turkestan and Siberia to Mongolia; from the Black sea to Bering sea and the Pacific ocean—the greater part, indeed, of Asia. Here we have a different geographic environment—a temperate but arid climate, vast steppes, where, on account of the drought, agriculture has always been impossible. Over these steppes immense flocks and herds of wild goats, camels, wild horses, and buffalo roam now as thousands of years ago. Here, in ages past, man, following where they led, gradually gathered them into herds and tamed and domesticated them. The herds must be cared for, be kept together, and guarded; goats and cows must be daily milked; must be pastured in summer, and the wild grass gathered for their winter use. Man learned to breed cattle, to increase his flocks and herds, for on them he depended for food, for clothing, for covering for his tents, and for all the other necessaries of life. His environment forced him into habits of foresight, of thrift, of thoughtfulness; and thus man took the first step in civilization. He ceased to be a savage and became a nomad; he acquired property, and for thousands of years lived, as now, the shepherd's life. Flocks and herds belonged to the family or tribe, and the land where they grazed was regarded as the property of the tribe, from which the flocks and shepherds of other tribes were driven away.

Gradually the family relation was established. The father or his eldest or strongest son became the patriarch, and the families of a common ancestor were united into a tribe with the patriarch as its chief. Gradually the idea of social life and patriarchal government was developed, but there was neither city nor state,

no close contact of man with man, no assembling into communities. The men tended their flocks; the women learned to spin and weave; some ideas of individual rights were developed. The nomad condition of life gave form to his habitation—a tent easily moved.

From Asia we turn to Europe, a country from its geographic environment better adapted for the *advancement* of civilization than any other quarter of the world. Its two long, narrow peninsulas, Greece and Italy, stretch southward into the Mediterranean; its seacoast, longer in proportion to the land surface than that of any other continent, is indented with excellent harbors on the north and south, with deep bays and gulfs; its islands of Great Britain, its temperate climate, its abundant rainfall and numerous rivers, its mountain ranges, easily crossed, afford facilities for the development of trade and commerce, of science, the arts, and civilization of all kinds not possessed by any other country; yet this land, so well suited for the progress of civilization, was unfitted to be the birthplace of civilization.

The life of primitive man in Europe has been longer and more thoroughly studied than in any other part of the world. Traces of the different stages in the development of primitive man through the Stone, Bronze, and Iron ages have been found in many places. We learn of the life of the Drift and Cave men and of the time when they lived from their implements and from the bones of animals. Their implements resemble those found in other continents. This, however, does not prove the acquaintance of one race with the work of another in a different continent, but that similar stages of development occurring in different places and at different times, produce a like results. These implements, which are very rude and simple, are made of the stones most easily worked, and show by their design that they could have been made only by man. In France and England these remains have been found in the banks of streams 50, 80, or even 100 feet above the present level of the river. The men of this period belong to the earliest Stone Age, and are called "Drift men." Their implements are found with fauna extinct before our earliest knowledge of natural history and known to us only as fossils, or else with the remains of such animals as the reindeer and woolly rhinoceros, now found only in arctic or tropical climates.

These Drift and Cave men lived the life of all primitive men, hunting and fishing, or eating roots and the fruits of trees. Neither in their physical nor mental condition were they much

superior to the wild beasts among which they lived. They had the mind of a child, with the strong animal passions of a man.

Great mounds, or cromlechs or barrows, as they are called in England and France, were probably built by these early races, possibly at the same time that a race of semicivilized men were building the pyramids of Egypt. The cromlechs and barrows, made at different times, are of different forms. Many of them were used as burial places. In the long barrows the dead were generally buried in a crouching or sitting posture. Major Powell tells us that the property used exclusively by the individual, such as clothing, ornaments, and weapons, was inherent in the individual, and to prevent strife was buried with the owner, together with food for the long journey.

The family relation and marriage were in their first germ, and the idea of property was scarcely more than that of the wild beasts. Many wild animals protect their right of property in the prey they take and in the females of their kind.

We have no certain knowledge when these men lived, but the great geographic changes which have taken place must have required thousands of years. They seemed to disappear from Europe; possibly they were destroyed by the changes of climate during the glacial era, which, as is now known, was not as great and far-reaching in Asia as in Europe and America. Some geologists do not believe that man lived in the glacial period; others that the Drift men of Europe were conquered by immigrant hordes from the East, who had reached a progress somewhat higher, and that thus the first upward step in European progress came from the influence of the Orient.

The superiority of the men of the later Stone and Bronze Ages is confirmed by comparisons between the skulls and other remains of the Stone and Bronze Ages. The skulls of the Stone Age are narrower and the men smaller than those of the Bronze Age. Those who lived in a limestone or volcanic country, or where there were fissures and caves in the rocks, made their homes in the rocks and caves. In such places as the Marne valley, where the rocks are soft, they excavated caves, and later built their habitations of limestone, shaping them after the cave. The weapons they used were superior in workmanship and variety to those of the Drift men, being often ground and polished. Charred wood has been found in these caves, showing a knowledge of the use of fire, but no pottery.

Far removed and strange as this life of the Stone Age may

seem to us, it is not more unlike our own than that of many of the tribes who within the present generation have lived in South America, Africa, Asia, and the islands of the Pacific. There is scarcely a custom, a habit, or an implement of primitive man that has not been found among one or more of these tribes. The Fuegians have been described by Darwin and Captain Ross, who visited Tierra del Fuego in 1839 and 1840. Captain Ross tells us "They are naked, except a sealskin mat thrown over the shoulders, living in a dome-shaped hut about the size of a hay stack, formed by branches of trees driven into the ground in a circle, the ends brought together at the top, and the interstices filled with smaller branches. They use stone fish-hooks and live on fish or any other food they can find, frequently eating it raw. They have no pottery, but make vessels for drinking and cooking of birch bark. They do not seem to have any form of government." Darwin says, "They are ill-looking, badly proportioned, stunted in their growth, their skins filthy and greasy, their voices discordant." On the Baltic, in a different environment, we find other traces of primitive man. Here are found great mounds of shells, bones, refuse of fish and wild animals, and a few pieces of earthenware, which show the beginning of pottery. In the mounds on the Baltic sea are found shells of salt-water oysters that do not now live in the Baltic, whose waters, formerly salt, are now brackish, showing the long period that must have elapsed since the mounds were formed. Thus the seashore adds its testimony to that of the rocks as to the antiquity of the race.

Their geographic environment taught them also navigation by the use of boats for fishing. The simplest form is a float, which may consist of a single log, trimmed of its branches, or of a great branch with the boughs remaining. Some races of people use bladders and inflated skins or cocoanuts, while the Californian ties reeds in bundles and thus forms a float. The earliest means of propulsion was paddling with the hands and feet. Gradually use was made of wind power, by holding up a leaf, bough, skin, or article of clothing as a sail; then a mat raised by one or two sticks. The mast and sail followed. The man who found that a pointed log made better headway than a square one had made great progress in shipbuilding. The shapely and skillfully constructed vessels of the present day are only the gradual evolution of the primitive log.

We have referred to the migrations of the men of the later Stone Age from the East. Without this habit progress and civilization

would have been impossible. "No community," says Maine, "when first known by the historian, can certainly be said to occupy its original seat." No instance can be found where a race has risen from savagery to civilization without contact and intermingling with races from countries where different environments have developed different intellectual activities. If, however, the disparity is too great between the old and the immigrant race, then the inferior fades away, for scarcely a single race has been found that can bear the contact. In trying to civilize we destroy.

We have referred to the immigrants from the east as having advanced the progress of Europe. These emigrations were the result of environment. As population increased in the plains of Asia, the land became insufficient for the support of a nomad people, with their vast herds of cattle. Few realize the amount of land required for the support of even a single family; the hunter and fisher required for his sustenance and that of his family a tract of one hundred square miles. For a small nomad tribe on the steppes of Asia, 500 to 600 square miles are required. In these regions man will ever remain content to be a savage or a barbarian. Where agriculture, trade, and industry are combined, the same land that supported one hunter is sufficient for the sustenance, in India and Europe, of 10,000 inhabitants, and in the state of Massachusetts of 25,000. One-fourth of the population of the world—savages and barbarians, constant wanderers—require three-fourths of the surface of the earth for their support. As population increases, the time invariably comes when the land is insufficient for the support of the increased number. The people must die of hunger or immigrate to other lands. Such immigrations, apparently always from the east to the west, or from the north to the south, have frequently occurred in the world's history. They have usually followed the same route, through passes and over plains to rich fertile regions. Forced by hunger, great hordes of Huns and Mongolians gathered under great warriors, of whom no record exists, left the plains of Asia, long before the time of Alaric or Attila, and wandered over the steppes, through the Pass of Dariel in the Caucasus to Asia, and on across Asia Minor and the Dardanelles to Greece, or else traveled across Russia, north of the Black sea, into Hungary, and thence spread over Europe. These early nomads belonged to the period of the Stone and Bronze Ages, and met in Europe the men of the later Stone Age, and as their

development was higher and their weapons were better, they easily overpowered the Europeans and mingling with them formed a new people or race. The Bronze Age was thus introduced into Europe. not as a progression from one stage to another, but by the invasion of a superior civilization. The immigrants drove their flocks and herds with them, for in the Bronze Age the larger proportion of the bones are those of domestic animals, while in the early Stone Age no bones of domestic animals are found, and very few in the later Stone Age. The inhabitants of Europe slowly passedfrom the Bronze to the Iron Age, from savagery to barbarism, and there progress ceased. How long this stagnation continued we cannot tell—possibly many thousands of years. The population of hunters and fishermen were satisfied and contented with their lot.

We have traced, in Equatorial Africa, in the Arctic regions, and in Europe the slow development of man, so far only as forced by his geographical environment. It is to the east that we must look for those conditions, which raised man through successive stages of savagery and barbarism to the highest civilization the world has ever known. In Egypt we find a people isolated on the north by the Mediterranean, on the east and west by the Desert, and on the south by the Cataracts, and thus protected for long ages from any foreign enemy. Their surroundings largely influenced the religion of the people. The desert which forever encroached on them was to them the type of death, while the Nile, their greatest blessing, to which they owed all the fertility of their valley, represented life. The sun and moon, in all their various phases, were deified and worshiped, as were the sky and wind. Every mysterious natural phenomenon which influenced their daily lives became an object of worship.

More wonderful than the Nile is the valley of Mesopotamia. It is about 1,200 miles in length, extending from the Persian gulf almost to the Mediterranean. A long range of mountains runs along the northern side; the boundless desert, on the other, stretches across Arabia and over the Red sea, through Africa to the Atlantic ocean. Through this valley flow the Euphrates and Tigris in nearly parallel lines, uniting shortly before they reach the Persian gulf. The fauna and flora of this valley are very rich and abundant; wheat and millet grow spontaneously. "So great was the fertility of the soil, according to Herodotus, grain commonly returned two hundred fold to the sower, and occasionally three hundred fold, while wheat, barley, sesame, ochrys,

palms, apples, and many kinds of shelled fruit grew wild, as wheat still does in the neighborhood of Anah." Pliny, too, says that wheat was cut twice and afterward was good for sheep. The valley between the rivers varies in width from ten to one hundred miles. These rivers in different spring months bring down the rich detritus from the mountains, inundating the valley, and as the water subsides the valley is covered with rich and abundant vegetation.

Here, many believe, was the Garden of Eden, and the reputed site of the Tower of Babel is daily visited. The region was early inhabited, and its fertility made it in all ages one of the richest portions of the world. Its aborigines on the Persian gulf lived by fishing, but as the population increased, they were forced to follow up the Tigris and Euphrates into the desert. For awhile food was abundant, but with the increase of population the supply failed. The conditions of environment taught man to depend on the inundation and to increase the amount of habitable land by digging irrigating canals. Eventually, thousands of large and small streams connected the two rivers and flowed southward into the desert. The valley and the desert thus became a garden, and the population rapidly increased. The irrigating canals were continually being enlarged, and for many generations the country sustained a population so vast that an ancient writer says that "for hundreds of miles a nightingale could fly from branch to branch of the fruit trees and a cat walk from wall to wall and housetop to housetop."

As there is little rainfall, the country was almost destitute of wood, and the river mud was used instead of wood and made into bricks. These, with or without straw, were hardened by the sun or fire and used for building adobe houses. Tablets were also made of mud or bitumen, which is found here in large quantities, and while soft, cuneiform inscriptions were written upon them and hardened in the sun. These have remained even to the present day. Large quantities of mud and clay from the canals were thrown out, sometimes banked up, forming small hills or mounds, upon which temples and palaces were built. Canes and reeds, growing along the banks of the canals, were cut and used for the roofs of buildings. They were inclined toward each other, joined at the top, coated with clay, and formed the roofs of the houses. In the temples and great palaces the canes were bent into an arch, supported underneath by other canes, making a wicker arch-work, on which layer after layer of mud

or bitumen was placed, until a solid roof was formed. Thus the architecture of the people here as elsewhere was the result of geographic environment.

As the population in Mesopotamia became dense, the people were forced into communities. These grew into towns and great cities. The patriarchal system still continued, though with greatly changed conditions. All related by blood or adoption were regarded as members of the tribe and all on an equality. The patriarch retained the ownership of the property, with power of life and death. With the increase of wealth, luxury, and power the people deteriorated. They lost the personal liberty and freedom of hunters and fishermen, and later of shepherds. The patriarch became a despot, the nomad a slave.

From the ruins of cities scattered all over this valley, we learn much of the history of this people, their character, habits, and manner of life. In Nipper, the city most recently excavated, by gentlemen connected with the University of Pennsylvania, the debris over one of its temples is 37 feet in thickness, the accumulation of about 4,000 years. Thirty feet below the ruins is the temple built by Mullil about 6,000 years before Christ, and here have been found monuments, pottery, and other evidences of civilization. The inscriptions even then had ceased to be pictures and were cuneiform; but the beginning of Babylonian writing lies far behind the foundations of the temple of Nipper. Recent writers tell us that "the flower of Babylonian art is found at the beginning of Babylonian history."

The inscription upon the temple tells us that "Millel, king of the universe, invested Lugal with the kingdom of the world. He filled all lands with his renown and subdued them from the rising of the sun to the setting of the sun—from the Persian gulf to the Upper Sea, where the sun sinks to rest, and granted him dominion over all things and caused all countries to dwell in peace." His capital was at Erech, which was called "The City." His empire extended from the Persian gulf to the Mediterranean, "the sea of the setting sun," and out into the Mediterranean to the island of Cyprus. Here lived Nimrod, "the mighty hunter before the Lord," and Ashur, "who builded Nineveh." Eighteen hundred years after Sargon, Abraham went forth from Ur of the Chaldees, near the mouth of the Euphrates, into the land of Canaan, and subsequently when Chedorlaomer, king of Elam, and Tidal, king of nations, took Lot, his nephew, and made him prisoner, Abraham armed his servants, attacked Chedorlaomer and Tidal by night, smote them, and liberated Lot.

About a thousand years later Sennacherib ruled, and about six hundred years before Christ Nebuchadnezzer lived, under whom the Jews were taken captive, "when by the rivers of Babylon they hung their harps." Bricks from the palace of Nebuchadnezzar, with his name and title still inscribed, now grace the walls of the most lowly Arab and Turkish dwellings. The names of all these kings have been recently found on some of the Babylonian tablets. The great rich valley of the Euphrates was filled with cities, some of them, such as Babylon and Nineveh, then and now the wonder of the world.

Here, 8,000 years ago, ruled Ensagana, "Lord of Kengi," "the land of canals and reeds." From the remains of the city and palaces he built, pieces of pottery have been recently taken of fine shape and as beautifully worked as the ancient pottery of Greece. Two thousand years later, or 3,800 years before Christ, flourished Sargon the First, founder of a new dynasty. On one of the statues the following inscription is found: "She placed me in a basket of rushes, with bitumen, the door of my ark she closed. She launched me on the river, which drowned me not. The river bore me along; to Akki the water-carrier it brought me. Akki the water-carrier in the tenderness of his heart lifted me up. Akki the water-carrier made me his gardener. And in my gardenership the goddess Ishtar loved me."

In Egypt, enclosed by the sea and desert, there was no need of large armies. Walled cities were not required, for there were few inhabitants in the desert, and for many centuries no hostile army appeared on its border. The geographic environment of Mesopotamia was different. On one side were mountains and valleys inhabited by numerous warlike wandering tribes, and beyond them the Nomads of Central Asia. The inhabitants of the valley must be ever ready to meet attacks, and this required an army and people accustomed to arms. Thus a different environment made peoples of different character. Their rulers were often great warriors, who led their armies in different directions, subduing countries far and near. As the mountains inhabited by these warlike tribes were near the plain, they were compelled to surround their cities with high and broad walls. Within these walls were large and populous cities; temples and palaces crowned the heights; the hanging gardens of Babylon were built; bridges connected the cities on either side of the Euphrates; cuneiform writing was largely used; libraries, filled with tablets, were founded, and civilization rose to the highest

point yet reached, which must have had its beginning ten thousand years ago.

When we remember the wonderful cities that flourished in this valley, its great population and high civilization, and reflect that this civilization continued from five to six thousand years—several thousand years longer than our own civilization; when we remember that certain portions of the valley are low, often inundated; that in summer the climate is hot and unhealthy; that the government was a despotism and the people slaves; that there was a great inequality between the upper and lower classes; civilization, refinement, and luxury in the upper classes and degradation in the lower classes, when we reflect that these conditions continued thousands of years, our interest in the people and country which produced such results must ever increase.

During the wars that often laid waste the valley the inhabitants were sometimes conquered and driven from their homes, far to the north and west. Many crossed the Ægean into Greece and carried to Greece and through it to Europe the civilization of the Orient. By this means Europe gradually passed from the Iron Age to the civilization of the present.

It is asked why, with the same geographic environment as in the days of Nineveh and Babylon, Mesopotamia, once the garden of the world, should have become a desert. We must again look to its environment. On the easterly and northerly sides of the valley, living among the mountains, were powerful and warlike tribes. These tribes, tempted by the wealth of the cities of the plain, made frequent inroads, killing its inhabitants. If the ruler was strong and powerful, they were driven back to their mountains. If he was weak, his government was overthrown; the mountain tribes took possession of the valley, killing the inhabitants, and sometimes destroying the cities and forming a new dynasty. Thus in different ages the Sumarians, the Chaldeans, Babylonians, Assyrians, Elamites, Hittites, Scythians, Parthians, Medes, and Persians under Cyrus; Greeks under Alexander, and Romans under Ptolemy conquered and plundered the valley. It was afterwards conquered by the Mongolians, and five hundred years ago it fell into the merciless and destroying hands of the Turk; for five centuries has been pillaged by its governors and officers; the taxes raised beyond the power of the people to pay, the water shut off from the land, the irrigating canals closed, the land laid waste, and famine and desolation followed. The sands from the desert

drifted in until the valley becames a waste, rich only in mounds and ruins of old empires.

The geographic position of Mesopotamia made it for thousands of years the great highway of the world—connecting the east and the west, Europe and Asia. Over it great caravans were constantly passing; but the carriage by canal was slow, expensive, and finally became dangerous.

Columbus, in his efforts to find a better way to the Orient, discovered America. Magellan circumnavigated Africa and opened a new route around the Cape of Good Hope, which was followed for nearly four hundred years, when a shorter way was opened through the Suez canal and Red sea; but the route through Mesopotamia must once again become the highway connecting the two continents, for it is now the route of the telegraph, and railroads are gradually finding their way from the Mediterranean to the valley of the Euphrates, and down the valley, as the shortest route and easiest road between the east and west. When the Turkish rule is overthrown and a good government established the population will increase, new cities will arise, and this valley may once more become the garden of the world.

The civilization of the valley of the Tigris and Euphrates traveled eastward into Persia and India, over the mountains into China, and down its great rivers to the Pacific, across the desert southward and up the Nile to the interior of Africa. From Babylon it commenced its westward course, tarrying first at the Mediterranean, where it exchanged the cuneiform writing of Babylon for the Phœnician alphabet, founded Tyre and Sidon. There it met a new environment, for the ocean added shipping and commerce to the civilization of Babylon.

The population of Mesopotamia, Tyre, and Sidon and their colonies was of the Sumarian or Semitic race. They had material wealth, the patriarchal or despotic rule, with little personal freedom, and their work in advancing civilization, which they had carried on for so many thousand years, finally came to an end. Another country and a different race must carry forward civilization and develop art, science, and literature. From Tyre and Sidon and the Semitic race, civilization moved westward to Greece, and there met the Aryan race, with different political and personal training, its home amid lofty mountains, enclosing rich valleys, with shores indented with deep gulfs and bays, harbors studded with islands. Instead of one great despotism,

geographic environment caused the creation of many small states; then a city became a state, frequently at war with its neighbors.

Literature, arts, and sciences, enriched with personal liberty and freedom of action, were added to the civilization of the Orient. In Greece all nature was on a small scale. Civilization needed a broader field, and from Greece it moved westward to Rome, where it acquired the principles of order and stable government and established its rule over many nations and peoples—savage, barbarian, and civilized. But personal freedom was, after the second century A. D., lost. The Roman tribune became an imperial Augustus, the world subject again to a single will. The Dark Ages followed, wherein the foundations of the states of modern Europe were laid. These ages of darkness must precede the Renaissance, and then for a short time the march of civilization was turned back toward the land of its birth. Constantinople was founded—that great and wonderful city, beautiful in situation, overlooking the Eastern and Western worlds; where continuous imperial power has existed longer than in any other city; where the literature, art, and science of the Old World were preserved that they might be handed down to Italy again when the Dark Ages were past. With the Renaissance, civilization finally turned westward and wended its way from Constantinople to Venice and Genoa. From Italy the culture of the Old World was carried on the great lines of travel to central and northern Europe.

With the Renaissance the lethargy of the Dark Ages was broken. Printing was invented, America was discovered, and civilization started on its westward course across the Atlantic to its home in a new world, where public schools, science, art, morality, and religion, with equality and freedom, are working out the civilization of the future.

We have seen that in the early life of our race man was not only dependent on his environment, but a slave to it. As he passed from savage to civilized life, he gradually threw off the yoke, relying more and more upon himself and becoming less and less dependent on his surroundings. Cold and heat, snow and rain, storm and sunshine, time and space, no longer control him. He not only rises superior to their power, but uses them for his own pleasure and purposes. In the infancy of his race the feeblest and most helpless of animals, the slave of his environment, he has in his manhood claimed and exercised the right to rule and become its master.

THE NATIONAL FOREST RESERVES

By Frederick H. Newell,

Chief Hydrographer, United States Geological Survey

Recent discussions in Congress regarding forest reservations have drawn public attention to matters relating to forestry, and many questions are being asked as to the nature, location, and purpose of our forest reservations. To answer these and similar questions it is necessary to have clearly in mind some fundamental facts concerning the geography of the country, with its resources and possibilities of development, especially in the portion west of the Great Plains.

The fact first in importance, and one that even in our own country needs to be strongly emphasized, is that the people of the United States, collectively as a nation, are still among the great landowners of the world. In the eastern half of the country nearly all the land formerly at the disposal of the national government has been disposed of, but in the western half the reverse is the case. Fully two-thirds of the land surface is still open to settlement under the homestead and similar acts, and with slight limitations is free to all citizens. In many of the states within this western half of the country less than one-fourth of the lands are subject to taxation, the great bulk being held by the national government. For example, in Nevada less than four per cent of the land surface has been disposed of and about one per cent has been reserved, over 95 per cent being still vacant; in Idaho less that seven per cent has been disposed of and about four per cent reserved, a little over 89 per cent being vacant. Similar conditions prevail to a somewhat less degree as regards the extent of public land in Wyoming, Utah, Montana, Arizona, New Mexico, and Colorado, while in the great state of California, with its comparatively dense population, over one-half of the area is vacant; the proportion in Oregon being still larger and in Washington a trifle less. In the Dakotas, the western half, excepting a small area around the Black Hills, may be considered as almost

uninhabited, and the same may be said of the western third of Nebraska, excepting along the Platte river.

It is not due to any lack of fertility that so much land is still in the hands of the general government. On the contrary, the greater part of this area has on it soil far richer than that of the average farm lands of the east. The one obstacle to its use lies in the scarcity or the irregularity of distribution of moisture. As a rule. it is arid and cannot be depended upon to produce crops each season unless artificially supplied with water. It supports, however, a scanty vegetation except in a few relatively small spots where the drifting sands or the accumulations of earthy salts prevent the growth of the hardy desert plants. Many of these plants are valuable as forage, and thus the public lands in their native condition are as a whole valuable for grazing.

It must not be supposed that the soil, though fertile, is everywhere adapted for agriculture even with irrigation. The surface of the country is in places extremely rough, the West being characterized by the great mountain masses of the continent. Many of the mountains rise to heights of 10,000 feet and over, and on account of their altitude and precipitous slopes receive a larger amount of rain and snow than the broad lands of the adjacent valleys. On the plateaux and ranges, especially at an altitude of 7,000 feet and upward, where the moisture is sufficient, the desert plants are replaced by larger growth, and considerable areas of woodland and even of dense forest abound. This is especially true in the country to the north and west of the main body of arid lands, where the Sierra Nevada, Cascade, and Coast ranges are thickly clothed with forests, among which are the groves of giant sequoias, the largest of existing trees.

It has been estimated that in the aggregate there are on the public lands lying within the arid or semiarid portions of the western public land states over 75,000,000 acres of forest, and besides this over 118,000,000 acres of land upon which scattering trees suitable for firewood, fencing, or other farm purposes are to be found. The public land areas have in their forests vast potential values, the ultimate realization of which is dependent, however, upon proper protection and conservation.

The first necessity of the pioneer in the West is water; next to this grazing for his animals, and then wood for fuel and for purposes of construction. As settlement progresses the demand for wood increases—more houses must be erected, more fences built,

more fuel consumed, and as mines are discovered and worked, wood in greater quantities is called for. The demand is ever growing, and many industries are dependent for success upon the ability to obtain lumber, timber, or firewood at low prices. With the great distances between centers of population and the expense of transportation in our sparsely settled West, the utilization of many resources is closely connected with the ability to obtain the neccessary wood near by, and with the relatively small areas of forest and the unfavorable conditions for rapid growth, it becomes important to perpetuate the wooded areas, so as to provide for the needs of the near future.

It is not alone, however, as furnishing a supply of material for industrial purposes that the forests have value. There is a belief prevailing throughout the country that the water supply for irrigation is dependent to a certain extent in quantity, and perhaps still more in continuity, upon the preservation of the forests upon the headwaters of the streams. Without water the great arid West is worthless, for not even mining can be carried on unless a moderate supply of water is available, and, as a matter of course, stock raising is also impracticable unless water exists near the open range. Everything, therefore, that affects the supply of water in a land of drought must be looked upon with the keenest solicitude, not only by the inhabitants of the country, but by the owners of the land, the people of the United States. It would seem, therefore, as though every effort should be made to ascertain the extent, value, and influence of the forest and to guard the perpetuity of the supplies of water and of wood.

In order to obtain a clear conception of the relative extent of the woodland and forest of the West, the following table is inserted, giving the area in acres of the seventeen western states and territories, and also the extent of the forest, the woodland, and the treeless area. There is also added a table showing the area of improved land in each of these political divisions in order to illustrate to what a small relative extent settlement has already progressed. In this table the classification has been attempted between the land which bears forests in whole or part and that where the conditions of soil and climate are such that only scattering wood is produced. Such a distinction must, of course, be arbitrary and crude, but for the present discussion it serves to convey general ideas.

*Forest, Woodland, Treeless, and Improved Areas in Western Public-land States**

States and Territories.	Land surface.	Forest.*a*	Woodland.	Treeless.	Improved.*b*
	Acres.	*Acres.*	*Acres.*	*Acres.*	*Acres.*
Arizona	72,268,800	10,000,000	8,700,000	53,464,672	104,128
California	99,827,200	18,000,000	27,000,000	42,604,361	12,222,839
Colorado	66,332,800	10,600,000	14,000,000	39,909,280	1,823,520
Idaho	53,945,600	10,800,000	21,600,000	20,939,238	606,362
Indian Territory	19,840,000	8,000,000	5,000,000	6,840,000	.....
Kansas	52,288,000	4,000,000	.....	25,984,699	22,303,301
Montana	92,998,400	17,000,000	18,600,000	56,482,883	915,517
Nebraska	49,177,600	1,500,000	.....	32,429,895	15,247,705
Nevada	70,233,600	1,000,000	5,300,000	63,210,548	723,052
New Mexico	78,374,400	4,700,000	16,500,000	56,911,294	263,106
North Dakota	44,924,800	400,000	.....	39,866,785	4,658,015
Oklahoma	24,851,200	500,000	.....	23,787,472	563,728
Oregon	60,518,400	20,600,000	17,000,000	19,402,400	3,516,000
South Dakota	49,184,000	1,000,000	.....	41,224,707	6,959,293
Utah	52,601,600	8,400,000	14,200,000	29,453,377	548,223
Washington	42,803,200	23,500,000	9,000,000	8,482,368	1,820,832
Wyoming	62,448,000	7,500,000	10,000,000	44,471,169	476,831
Total	992,617,600	147,500,000	166,900,000	605,465,148	72,752,452
Per cent	100	14.86	16.81	61	7.33

a Report of the Secretary of Agriculture for 1893, pp. 317, 318.
b Abstract of the Eleventh Census, 1890, Washington, 1894, pp. 62, 63.

The figures given in this table have been used in the construction of the following diagram, which brings to the eye graphically the relative area of the different states and territories of the West and also the amount and proportion of the various classes of land. The length of the horizontal bar opposite the name of each state and territory is made proportional to the area of this political division. Each bar is divided into three or four divisions, the open or white part being proportional to the extent of the treeless land, the cross-hatched portion proportional to the area of the woodland, and the solid black to that of the forest. To the right of this in a few cases, notably in California, is given the relative extent of improved land. In some of the other states this is so small that it can scarcely be distinguished.

* The Public Lands and their Water Supply, by F. H. Newell. Extract from the 16th Annual Report of the U. S. Geological Survey, part ii, p. 482.

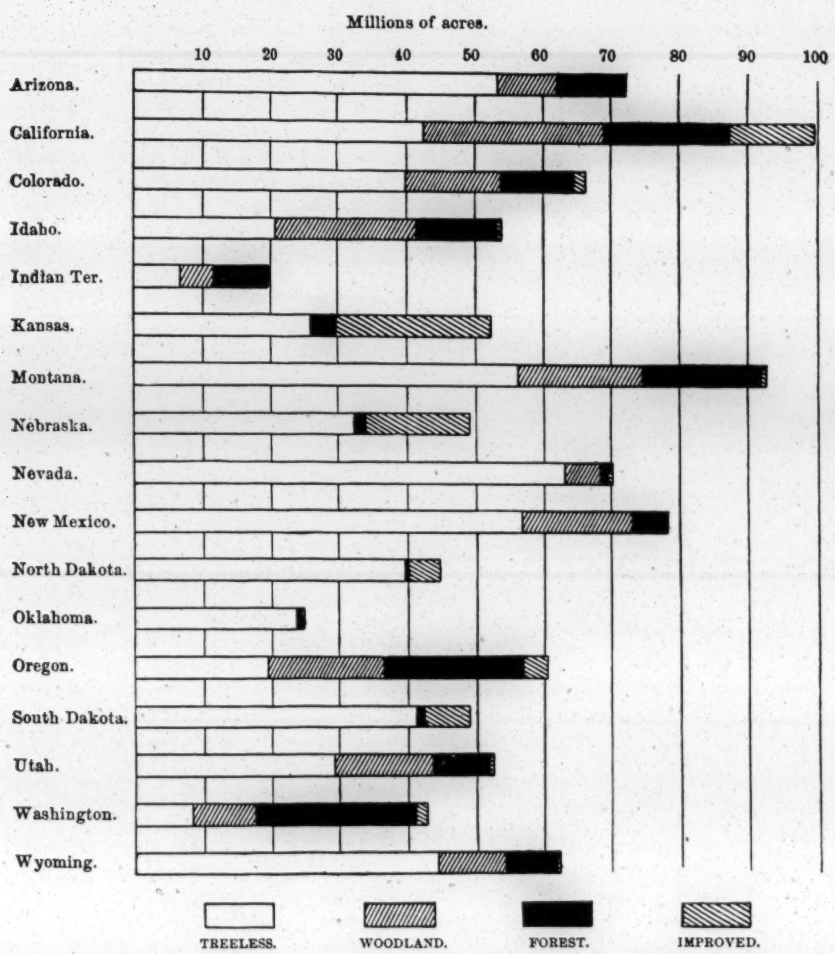


Diagram illustrating relative areas of forest, woodland, treeless, and improved land in the western states.

In the table and diagram the whole of each state and territory was considered, but since from 3 to 50 per cent or even more of the area of these states and territories has been disposed of, the general public, as the owners of the remainder, are more immediately concerned with that part which is still vacant. The *following table* gives the amount of vacant land in each of 15 states and territories, Kansas being omitted as having a very small area of public land, while Indian Territory is not considered, from the

fact that all the land is at present reserved for the use of the Indians. There is also given in round numbers a classification of the vacant land into grazing or treeless, woodland, forest, and desert. To the right of this is appended a somewhat crude estimate as to the area that can be supplied with water for agricultural purposes, assuming that all the available supply is utilized. This assumption, of course, involves so many contingencies as regards conservation of floods, development of underground supplies, and other conditions that it is open to criticism, but nevertheless it may be useful as showing present opinions in the matter.

Vacant Lands in the Western Public-land States *

States and Territories.	Vacant.		Millions of acres.				
	Square miles.	Acres.	Grazing.	Wood.	Forest.	Desert.	Water supply.
Arizona	85,908	54,981,120	30	3	7	15	2
California	90,215	57,737,600	27	5	6	19	17
Colorado	66,934	42,837,760	30	7	6	0	8
Idaho	75,099	48,063,360	19	20	8	0	5
Montana	114,057	72,996,480	50	13	10	0	11
Nebraska	17,186	10,999,040	11	0	0	0	2
Nevada	104,571	66,925,440	42	5	0	20	2
New Mexico	85,302	54,593,280	45	8	2	0	4
North Dakota	33,090	21,177,600	21	0	0	0	1.5
Oklahoma	15,213	9,736,320	9	0	0	0	1
Oregon	55,887	35,767,680	17	11	9	0	3
South Dakota	25,204	16,130,560	15	0	1	0	1.5
Utah	67,308	43,077,120	16	11	6	10	4
Washington	32,757	20,964,480	6	5	10	0	3
Wyoming	83,644	53,532,160	36	8	5	5	9
Total	952,375	609,520,000	374	96	70	69	74

The following diagram has been prepared to show graphically the facts expressed by the figures in the foregoing table. By comparison with the preceding table and diagram it will be seen that a considerable proportion of the forest areas has already passed out of the hands of the government, but that in round numbers about seventy million still remain, and though only about half of the whole extent of forest it is still a matter of great importance, especially as nearly all of this is included within

* The Public Lands and their Water Supply, p. 494.

the boundaries of the arid region, where wood and water have the highest value.

It is now generally accepted that only a small proportion of the fertile lands of the West can ever be irrigated, owing to the inadequacy of the water supply. Such being the case, it is ob-

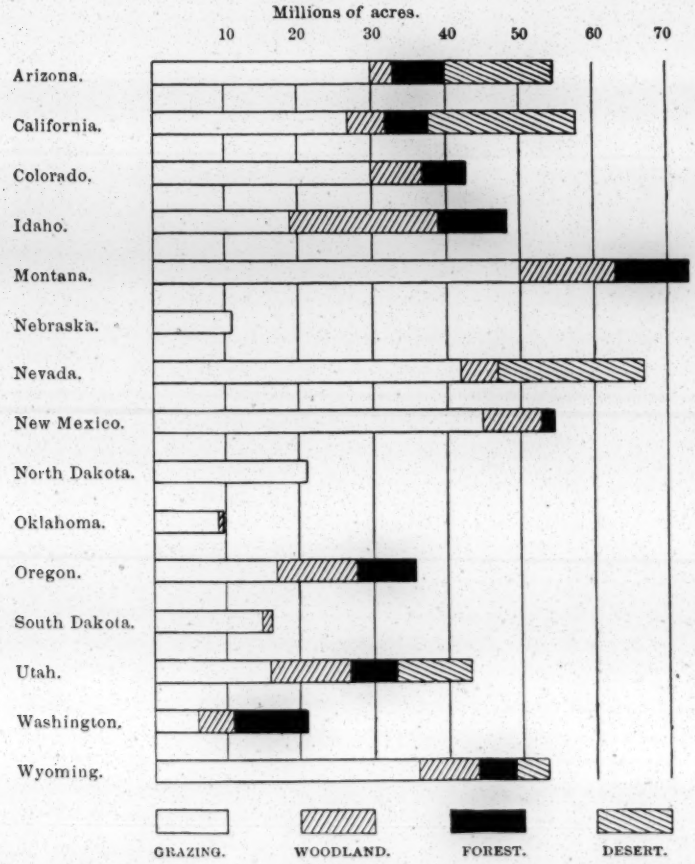


Diagram illustrating proportion of vacant lands, classified according to grazing, woodland, forest, and desert areas.

vious that much of the land has little or no value, except as furnishing scanty grazing. Agricultural land values thus rest directly upon the ability to obtain water, and as this is limited, the great bulk of the area of the West must apparently always be devoted to pastoral purposes or to the growing of trees, where the conditions are such that these will thrive. The United

States must therefore continue to be a great landowner, unless the lands are disposed of wholesale to states or to corporations. The unoccupied lands are now open, furnishing free pasturage to all persons who have cattle, horses, sheep, or goats, and the woodlands are almost equally free to be cut and burned by settlers. A few restrictions have been imposed with the intention of preventing the wholesale depredations of the forests by lumber companies, but these have in the main been ineffective, the great companies being able to cut almost without limit.

The question may be asked, Why should not the government allow every one to take what lumber he desires, as in the case of the mineral wealth, where mines, when found and operated, become the property of the discoverers, irrespective of their value? The radical difference between these two sources of wealth lies in provision for the future. In the case of mining, ordinarily no amount of foresight will increase the quantity of mineral available for the next generation, but with the forests the reverse is the case. It has been argued by men familiar with the subject that as matters are now proceeding the timber supply in many localities will be entirely destroyed within a half generation, while with a moderate exercise of prudence the supplies may be made practically continuous, guaranteeing the perpetuity of many industries. As owners of the forests, the people of the United States should, from motives of prudence, see that these resources are not wasted, and still more, as owners of vast tracts of land dependent for utilization to a greater or less degree upon the forests, should they make most strenuous exertions to indefinitely preserve the latter.

But it may further be asked whether any special steps need be taken to preserve the forests. Will not the local and individual interests be sufficient to guard against waste? Theoretically this may be possible, but the experience of mankind in the old world and in this has shown that individual and present profits are as a rule placed far above public and remote interests. In other words, while the farmer usually needs no interference or urging in maintaining the fertility of his wheat field and adopting methods that will secure the largest crop each year, he does require some strong incentive to maintain forests or woodlands in which he is but a small owner and from which the crop may be cut only once in a generation. An agency of longer life than that of ordinary men is needed to sustain the work of forest production—such an agency, in short, as is the state or nation.

If we admit that something should be done to secure the perpetuity of the great public forests, the query at once arises as to what it should be and how we should go about it. The most direct way would undoubtedly be to at once reserve all forest lands, have them surveyed and examined, appoint suitable men to take charge of them, to protect them from fire, to designate trees that may be cut, and to attend to the details of the utilization and preservation of the tree growth. A system of this kind once fairly under way would unquestionably be more than self-sustaining and would bring to the government a considerable and constantly increasing income, besides furnishing a perpetual supply of timber, protecting the sources of water, and adding to the natural attractions which draw tourists to remote parts of the country. But such a step involves many radical changes. The people as a whole are not educated up to it. Those in the West are afraid of interference in local concerns, and those of the East are fearful lest large expenditures should be incurred. As a compromise, therefore, the friends of forestry have proposed that, instead of taking all the forests, certain specified spots should be designated, and that these should be reserved for forestry purposes in the hope that later some provision might be made for carrying out a system outlined above, and that the system, if it proved efficient, might be extended gradually further and further. Accordingly many bills have been introduced into Congress, but have all failed from one cause or another. At length, after many failures, a clause was inserted in "An act to repeal timber-culture laws, and for other purposes," approved March 3, 1891, providing, "That the President of the United States may from time to time set apart and reserve in any state or territory having public land bearing forests, in any part of the public lands, wholly or in part covered with timber or undergrowth, whether of commercial value or not, as public reservations, and the President shall, by public proclamation, declare the establishment of such reservations and the limits thereof."

The then Secretary of the Interior, the Hon. John W. Noble, took great personal interest in this matter of forest reservation, and through his active assistance the friends of the forestry movement were able to secure the proclamation by President Harrison of fifteen reservations, having an aggregate area of over thirteen million acres. They then renewed their efforts to secure suitable legislation and energetically supported the attempts made to pass laws allowing the reservations to be protected and

properly utilized. Among others, the McRae bill (H. R. 119) was passed twice by the House, and in a slightly different form once by the Senate, but failed of final consideration. Soon after the beginning of his administration President Cleveland proclaimed two reservations, one of these, the Cascade Range Forest Reserve, in Oregon, being of enormous size, embracing nearly four and a half million acres.

As session after session of Congress passed without the needed legislation to protect these reservations, the friends of forestry united upon a new line of action. The American Forestry Association, in its executive sessions, drew up a letter, subsequently signed by the Secretary of the Interior, the Hon. Hoke Smith, calling upon the National Academy of Sciences for information upon the whole subject. Secretary Smith also asked that Congress appropriate the sum of $25,000 for this purpose. In the act approved June 11, 1896, this amount was accordingly set aside "to enable the Secretary of the Interior to meet the expenses of an investigation and report by the National Academy of Sciences on the inauguration of a national forestry policy for the forested lands of the United States." The commission appointed by the President of the Academy at once took up the subject and as soon as practicable visited many of the forestry areas of the West, making a preliminary report to the Secretary of the Interior on February 1, 1897, recommending the establishment of thirteen additional forest reserves. The recommendation was at once acted upon, and on February 22 President Cleveland proclaimed the thirteen reserves, containing an estimated area of over twenty-one million acres.

The commission in this preliminary report recognized the difficulty of securing suitable legislation for the protection of the forests or of the reservations, and accordingly used, as one of its arguments for making these reservations, the fact that a greater number of persons would be induced by self-interest to urge upon Congress the enacting of laws which public interests alone have not been sufficient to bring about. The commission "believes that the solution of this difficult problem [of forest management] will, however, be made easier if reserved areas are now increased, as the greater the number of persons interested in drawing supplies from the reserved territory or in mining in them, the greater will be the pressure on Congress to enact laws permitting their proper administration." The wisdom of this argument was seen in the demand from the West for immediate

action on the part of Congress. This demand resulted in the insertion in the sundry civil bill that became a law June, 1897, of a number of paragraphs which put into effect at once many of the provisions of the McRae bill. The legislation thus secured, while open to criticism in many directions, marks a distinct progress and is undoubtedly the best that can be had under the circumstances, where such a large and influential body of citizens are interested in preventing any measure which shall interfere with their obtaining practically for nothing the great stores of public timber.

The bill provides for the immediate survey of the boundaries and for the suspension until March 1, 1898, of the thirteen reservations proclaimed on February 22, 1897. It is explicitly declared that "no public forest reservations shall be established except to improve and protect the forest within the reservation, or for the purpose of securing favorable conditions of water flows, or to furnish a continuous supply of timber for the use and necessities of citizens of the United States; but it is not the purpose or intent of these provisions . . . to authorize the inclusion therein of lands more valuable for the mineral therein or for agricultural purposes than for forest purposes."

Authority is given to the Secretary of the Interior to make suitable regulations for protection against fire and depredations and for the sale of dead, matured, or large growth of trees. On the other hand, the rights of prospectors and miners are carefully guarded by the statement that "nor shall anything herein prohibit any person from entering upon such forest reservations for all proper and lawful purposes, including that of prospecting, locating, and developing the mineral resources. Settlers, miners, residents, and prospectors may be permitted to use timber for firewood, fencing, buildings, mining, and domestic purposes."

GEORGE W. MELVILLE

Engineer-in-Chief, U. S. Navy

The National Geographic Magazine presents to its readers with this number a portrait of one of the most distinguished members of the Society of whose proceedings it is the exponent. Born in the city of New York January 10, 1841, young Melville, after graduating in the Polytechnic School of Brooklyn, acquired

a thoroughly practical knowledge of engineering in the works of James Binns of that city. Stirred to patriotic effort by the outbreak of the rebellion, he entered the Navy July 29, 1861, and became an officer of the Engineer Corps of that service before attaining his majority. Constantly on sea duty, Melville saw service on the Great Lakes, in the North Atlantic blockading squadron, at the capture of Norfolk and in the operations on James river, on the Mississippi river, in the capture of the *Florida*, and as a volunteer in one of the torpedo boats at the capture of Fort Fisher. His most conspicuous war service was in connection with the capture of the *Florida* in the harbor of Bahia, Brazil, Melville, in civilian clothing, boarding the vessel in broad daylight and gaining the desired information as to the strength of her battery and the location of her machinery. In the capture of the *Florida* on the following morning Melville displayed his usual bravery, and was one of the three men wounded in the affair. His war services were such that Engineer-in-Chief Loring officially wrote, "With the high reputation this gentleman has throughout the service for professional skill, executive ability, energy, and zeal, . . . it is no disparagement to his fellows to say that he has not his superior in his corps."

The dangers of war past, Melville sought the first opportunity for adventurous service elsewhere, and volunteering for service in the *Tigress*, formed one of the search party for the missing crew of the *Polaris*. The *Tigress*, under Commander Greer, reached the deserted camp of the *Polaris*, near Littleton island, the success of the voyage being largely owing to Melville's "great fertility of resource, combined with thorough practical knowledge."

His most conspicuous arctic service was under Lieut. D. W. De Long in the *Jeannette*, which attempted to solve the polar problem *via* Bering strait. As will be recalled, the *Jeannette*, beset by the pack in the neighborhood of Wrangel island in September, 1879, drifted almost steadily to the westward until she was crushed by ice-floes and sank June 12, 1881, in 77° 15′ N., 155° E. During this long and monotonous drift Melville's qualities as a man and his efficiency as an officer were conspicuously displayed; now it was a series of engineering problems which saved from foundering the leaking *Jeannette*, again it was physical endurance and will-power as the leader of an exploring party that enabled him to reach and survey Henrietta island, the first of De Long's discoveries. It was under the most desperate conditions, however, that Melville's spirit and abilities were practi-

cally indispensable—when the *Jeannette* sank five hundred miles from the Lena Delta.

Lieutenant Danenhower being disabled and Lieutenant Chipp sick, De Long's main dependence was in his chief engineer, Melville, who was well, strong, energetic, and fertile in resources. It is unnecessary to dwell on the dangers and hardships which this unprecedented journey entailed on the members of this party, which were met with fortitude, courage, and energy that made its successful issue one of the most notable efforts in the history of man, overcoming obstacles almost insurmountable. It is only to be said that in this fearful journey for life Melville, as the right arm of De Long, was full of energy and expedients. Such was De Long's confidence in Melville, that, when the three boats left Bennet island, De Long placed the whale-boat entirely under his orders, although Danenhower was placed therein. This unusual step was fully justified by the events, as Melville's boat's crew was the only one that was saved, Chipp perishing at sea and De Long in the Lena Delta. When De Long's desperate condition became known, it was Melville's heroic spirit and personal daring that ventured the unsuccessful autumnal search and later, in the brighter but more fearful polar spring, discovered the remnant of De Long's unselfish crew and secured for them a Christian burial. Congress, in 1890, promoted him fifteen numbers "as a recognition of his meritorious services in successfully directing the party under his command after the wreck of the Arctic exploring steamer *Jeannette*, and of his persistent efforts, through dangers and hardships, to find and assist his commanding officer and other members of the expedition before he himself was out of peril."

In 1883 Melville volunteered to lead a relief party for the rescue of the Lady Franklin Bay Expedition, which had that autumn retreated under orders to Cape Sabine, and when the government rejected a proposition, the heroic Melville sailed in the expedition of 1884 commanded by Captain Schley, and was one of the first officers to reach the living remnant of the expedition, and thus closed with credit his service afloat.

Selected in 1887 as Chief Engineer of the Navy with the relative rank of Commodore, he has discharged the important duties of this office with such professional fitness and administrative ability as to merit universal praise. During this period the United States Navy has been substantially reorganized and with a degree of success that has enlisted the admiration of the world.

As the engineering head of more than sixty vessels of all types, from torpedo boats to battle ships, it may at least be said with perfect safety, that as much to Commodore Melville as to any other man in the Navy is due its remarkable degree of efficiency as regards its vessels and its materials.

In recognition of his professional ability, of his Arctic career, and of his qualities as a man, George Wallace Melville has been the recipient of distinguished honors from governments and scientific institutions not only of America, but also of foreign countries. A. W. G.

GEOGRAPHIC SERIALS

The Journal of the Royal Colonial Institute for May contains an extremely interesting article, entitled "Western Canada Before and Since Confederation," by Sir Donald A. Smith. It comprises an outline of the history of the region while it was under the control of the Hudson's Bay Company and a summary of its development since it became a part of the Dominion of Canada.

The June number of the same Journal contains a paper on the "Colony of Largos, by Sir Gilbert T. Carter. It is mainly a history of this little colony of Western Africa, with a summary of its present trade and social conditions.

The Scottish Geographical Magazine for May opens with an article by Nansen, entitled "Some Results of the Norwegian Arctic Expedition," accompanied by a map. It contains also an account of a trip to Mount Tarawera in New Zealand, with an account of the topographic changes produced by its great eruption in 1886. This is illustrated by a map showing the present topography of the surrounding region.

The June number of *The Scottish Geographical Magazine* contains an important article by Dr Robert Bell on the "Geographical Distribution of Forest Trees in Canada." Mr W. Saville Kent writes on "The Market Fishes and Marine Commercial Product of Australia."

The Geographical Journal contains several articles of interest. Nansen contributes "Some Results of the Norwegian Arctic Expedition," which is followed by a discussion on the North Polar problem. "The Mesopotamian Petroleum Field" is described by Capt. F. R. Maunsell. "The Formation of the Dungeness Foreland" is described by Mr F. P. Gulliver, and a summary is given of recent "Russian Expeditions in Tibet."

The Quarterly Journal of the Manchester Geographical Society contains a number of articles of interest, among them "The Growth and Progress of the Australian Colonies," by Mr W. Harper, which is accompanied by a relief map; "Meteorology of Queensland," by Mr Clement L. Wragge; "The Suez Canal," by Mr Isaac Bowes, and "The Nicaragua Canal, as Proposed by the Maritime Canal Company," by the same gentleman; "The Canals and Navigable Rivers of England," by Mr Lionel B. Wells;

"The Earthquakes of Iceland in 1896," by Mr John R. Newby; "Physical Geography of Northeast Lancashire," by Mr Herbert Bolton.

The Technological Quarterly for March contains, among other papers, an interesting article on "The Scientific Work of the Boston Party on the Sixth Peary Expedition to Greenland," by Mr G. R. Putnam. Besides giving a narrative of the expedition, this article contains a summary of the Magnetic and Pendulum Observations.

The Sierra Club Bulletin for May opens with an article on "The Conifers of the Pacific Slope," by Mr John G. Lemmon. An entertaining story is contributed by Helen M. Gompertz, entitled "Up and Down Bubbs Creek," and Mr Bolton Coit Brown continues his "Wanderings in the High Sierra."

The Journal of Geology for February-March contains an article by Prof. R. D. Salisbury on the "Drift Phenomena in the Vicinity of Devils Lake and Baraboo, Wisconsin," describing the formation of the strange glacial deposits of that region. The same journal for April-May continues the "Glacial Studies in Greenland" of Prof. T. C. Chamberlin.

The Journal of the Tyneside Geographical Society for May devotes half its space to Nansen's explorations. For the rest it contains a narrative of a journey in Benin by James Pinnock and T. B. Auchterlonie, and summaries of lectures delivered before the society.

H. G.

PROCEEDINGS OF THE NATIONAL GEOGRAPHIC SOCIETY, SESSION 1896–'97

Special Meeting, May 7, 1897.—President Hubbard in the chair. Mr Walter Dwight Wilcox read a paper, with lantern illustrations from original photographs, on Scenery and Camp Life in the Canadian Rockies.

Annual Meeting, May 14, 1897.—President Hubbard in the chair. The Treasurer read a progress report on the condition of the Society's finances, postponing the presentation of a complete report until the close of the fiscal year. A committee, consisting of Messrs W. A. De Caindry, H. C. Rizer, and S. A. Aplin, Jr., was appointed to audit the Treasurer's accounts. Mr Marcus Baker, Col. H. F. Blount, Lieut. E. Hayden, U. S. N., Dr C. Hart Merriam, and Prof. W. B. Powell were reëlected members of the Board of Managers, and Mr Frederick V. Coville, Botanist of the U. S. Department of Agriculture, was elected in place of Mr J. B. Wight, whose newly assumed duties as a Commissioner for the District of Columbia prevented him from offering himself for reëlection. The meeting adjourned until Friday, June 11, 1897.

Special Meeting, May 21, 1897.—President Hubbard in the chair. The meeting was devoted to the following papers in connection with the approaching excursion to Manassas Gap: The Blue Ridge and Piedmont Plateau, Prof. W J McGee; Manassas to Manassas Gap, a Chapter of War History, Major Jed Hotchkiss.

Annual Excursion and Field Meeting, May 22, 1897.—About 250 members and guests went by special train, leaving Washington at 9 a. m., *via* Manassas and Thorofare Gap, to Manassas Gap, Va. On arrival, at 11.15 a. m., a field meeting was held in the open air, President Hubbard in the chair, and addresses were delivered by Major Jed Hotchkiss, on War History; Mr M. R. Campbell, on the Geography and Geology of the Region; and Gen. Chas. H. Grosvenor, M. C. Lunch was then served, after which an ascent of Mt. Monterey, to the northward, was made by many of the party, a few climbing High Knob, to the southward. The return to Washington was made at 4.30 p. m., arriving at 6.30.

Adjourned Annual Meeting, June 11, 1897.—Vice-president Merriam in the chair. The annual report of the Recording Secretary was read and accepted. The annual report of the Treasurer was read and referred to the Auditing Committee. The Recording Secretary stated that as no printed notice of pending amendments to the By-laws had been sent to members, owing to his enforced absence from the city, they could not properly come up for final action at that meeting. Said amendments are as follows:

ARTICLE V. Add "No initiation fee shall be required of ex-members in case of their reëlection to membership. Annual dues shall be reduced one-half for the current season in the case of members elected after the end of January, or who resign before that date; and they shall be remitted altogether for the current season in the case of members elected in April and May, upon payment of full dues for the following season." Omit "Suitable rebates may be made, in the discretion of the Board of Managers, in the annual dues of members elected in April and May."

Omit "within thirty days after election" (payment of dues by new members), and add "upon notice of election, and no certificate of election shall be issued until the required first payment shall have been made."

After "Annual dues may be commuted and life membership acquired by the payment of fifty dollars" add ", or, by ex-members or members who have already paid in dues as much as fifty dollars, by the additional payment at one time of twenty-five dollars."

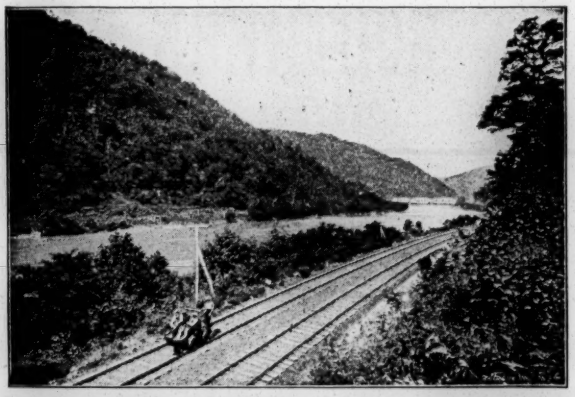
Add "Suitable restrictions may be made in the issue of tickets and publications to members in arrears."

ARTICLE VI. Omit "The Board of Managers shall set apart a time and place for the annual address of the President and Vice-presidents."

ARTICLE VII. Insert after "which (the magazine) shall be sent to all members of the Society," insert "not in arrears of dues." Add at end of same paragraph, "The number issued next after the annual meeting shall contain the By-laws and a list of the Officers and Members of the Board of Managers."

ELECTIONS—*May 7.*—Geo. F. Curtis, Elmer S. Farwell, Alpheus H. Hardy, Evert L. Harvey, Prof. Jos. V. Jackman, John P. Logan, Hon. L. T. Michener, Henry T. Offterdinger, Miss J. A. Read, Clinton Smith, Herbert Wright.

June 11.—L. S. Brown, Lieut. J. B. Cahoon, U. S. N., John G. Gosseling, Niels Grön, Judge Martin F. Morris, Miss Morris, James B. Pinkerton, Hon. Theodore Roosevelt, Miss Louise Taylor.



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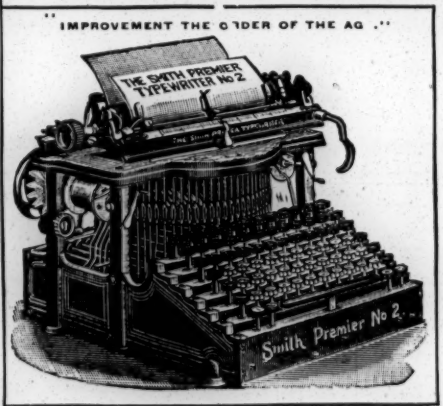

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HAND	COMPASS WHIST SCORE	COMPASS WHIST TOTALS	COMPASS WHIST TRUMP	COMPASS WHIST OPPONENTS	HAND
	DUPLICATE WHIST SCORE	DUPLICATE WHIST GAIN	DUPLICATE WHIST TRUMP	DUPLICATE WHIST GAIN / SCORE	
1					1
2					2
3					3
4					4
5					5
6					6
7					7
8					8
9					9
10					10
11					11
12					12
13					13
14					14
15					15
16					16
17					17
18					18
19					19
20					20
21					21
22					22
23					23
24					24
TOTALS					TOTALS

189.....

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